

#### **401 KAR 61:015. Existing indirect heat exchangers.**

NATURAL RESOURCES AND ENVIRONMENTAL PROTECTION CABINET  
Department for Environmental Protection  
Division for Air Quality

Relates to: KRS Chapter 224

Pursuant to: KRS 13.082, 224.033

Necessity and Function: KRS 224.033 requires the Department for Natural Resources and Environmental Protection to prescribe regulations for the prevention, abatement, and control of air pollution. This regulation provides for the control of emissions from existing indirect heat exchangers.

##### **Section 1. Applicability.**

The provisions of this regulation shall apply to each affected facility commenced before the applicable classification date defined below.

##### **Section 2. Definitions.**

As used in this regulation, all terms not defined herein shall have the meaning given them in 401 KAR 50:010 and 401 KAR 50:025.

- (1) "Affected facility" means an indirect heat exchanger having a heat input capacity of more than one (1) million BTU per hour.
- (2) "Indirect heat exchanger" means any piece of equipment, apparatus, or contrivance used for the combustion of fuel in which the energy produced is transferred to its point of usage through a medium that does not come in contact with or add to the products of combustion.
- (3) "Classification date" means:
  - (a) August 17, 1971, for affected facilities with a capacity of more than 250 million BTU per hour heat input;
  - (b) April 9, 1972, for affected facilities with a capacity of 250 million BTU per hour heat input or less.

##### **Section 3. Method for Determining Allowable Emission Rates.**

- (1) Except as provided in subsection (3) of this section, the total rated heat input capacity of all affected facilities, commenced before the applicable classification date within a source shall be used as specified in Sections 4 and 5 to determine the allowable emission in terms of pounds of effluent per million BTU heat input.
- (2) At such time as any affected facility is assigned an allowable emission rate by the department, at no time thereafter shall that rate be changed to inclusion or shutdown of any affected facility at the source.
- (3) (a) A source may petition the department to establish an allowable emission rate which may be apportioned without regard to individual affected facility heat input provided that the conditions specified in paragraphs (b), (c), (d), and (e) of this subsection are met. Such allowable emission rate shall be determined according to the following equation:  $F = (AB + DE)/C$

Where:

A = the allowable emission rate (in pounds per million BTU input), as determined according to 401 KAR 59:015, Section 3(1);

B = the total rated heat input (in millions of BTU per

hour) of all affected facilities commenced on or after the applicable classification date within a source, including those for which an application to construct, modify, or reconstruct has been submitted to the department;

- C = the total rated heat input (in millions of BTU per hour) of all affected facilities within a source, including those for which an application to construct, modify, or reconstruct has been submitted to the department;
- D = the total emission rate (in pounds per million BTU input) as determined according to subsection (1) of this section;
- E = the total rated heat input (in millions of BTU per hour) of all affected facilities commenced before the applicable classification date;
- F = the alternate allowable emission rate (in pounds per actual million BTU input).

- (b) At no time shall the owner or operator of the source allow the total emissions (in pounds per hour) from all affected facilities within the source divided by the total actual heat input (in millions of BTU per hour) of all affected facilities within the source to exceed the alternate allowable emission rate as determined by paragraph (a) of this subsection.
- (c) At no time shall the owner or operator of any source subject to federal new source performance standards allow the emissions from any affected facility commenced on or after the applicable classification date to exceed the allowable emission rate determined by use of that affected facility's rated heat input (instead of the heat input as determined by subsection (1) of this section) as specified in 401 KAR 59:015, Sections 4 and 5.
- (d) The owner or operator of the source must demonstrate compliance with this subsection by conducting a performance test according to 401 KAR 50:045 on each affected facility under such conditions as may be specified by the department.
- (e) Upon petition, the department will establish an alternate emission rate in accordance with this subsection if the owner or operator demonstrates to the department's satisfaction that the source will maintain compliance with this subsection on a continual basis.

#### **Section 4. Standard for Particulate Matter.**

Except as provided for in Section 3(3), no owner or operator of an affected facility subject to the provisions of this regulation shall cause to be discharged into the atmosphere from that affected facility:

- (1) Particulate matter in excess of that specified in Appendix A of this regulation;
- (2) Emissions which exhibit greater than twenty (20) percent opacity in regions classified as Priority I with respect to particulate matter, except:
  - (a) That, for cyclone or pulverized fired indirect heat exchangers, a maximum of forty (40) percent opacity shall be permissible for not

more than two (2) consecutive minutes in any sixty(60) consecutive minutes;

- (b) That, for stoker fired indirect heat exchangers, a maximum of forty (40) percent opacity shall be permissible for not more than six (6) consecutive minutes in any sixty (60) consecutive minutes during cleaning the fire box or blowing soot and, for indirect heat exchangers with stationary grates, a maximum of forty (40) percent opacity shall be permissible during cleaning of the grates for not more than three (3) consecutive minutes in any sixty (60) consecutive minutes for each section of grates that are cleaned;
  - (c) For emissions from an indirect heat exchanger during building a new fire for the period required to bring the boiler up to operating conditions provided the method used is that recommended by the manufacturer and the time does not exceed the manufacturer's recommendation.
- (3) Emissions which exhibit greater than forty(40) percent opacity in regions classified as Priority II or III with respect to particulate matter except:
- (a) That, for cyclone or pulverized fired indirect heat exchangers, a maximum of sixty (60) percent opacity shall be permissible for not more than two (2) consecutive minutes in any sixty (60) consecutive minutes;
  - (b) That, for stoker fired indirect heat exchangers, a maximum of sixty (60) percent opacity shall be permissible for not more than six (6) consecutive minutes in any sixty (60) consecutive minutes during cleaning the fire box or blowing soot and, for indirect heat exchangers with stationary grates, a maximum of sixty (60) consecutive minutes for each section of grates that are cleaned;
  - (c) For emissions from an indirect heat exchanger during building a new fire for the period required to bring the boiler up to operating conditions provided the method used is that recommended by the manufacturer and the time does not exceed the manufacturer's recommendation.
- (4) The emission limitations contained in other subsections of this section shall not apply to any affected facility (with more than 250 million BTU per hour heat input capacity which was in being or under construction before August 17, 1971, or any affected facility with 250 million BTU per hour capacity or less which was in being or under constructed prior to April 9, 1972) if that affected facility was in compliance prior to April 9, 1972, with, or has a valid permit to operate within the provisions of the previous Kentucky Air Pollution Control Commission Regulation No. 7 entitled "Prevention and Control of Emissions of Particulate Matter from Combustion of Fuel to Indirect Heat Exchangers." These affected facilities shall comply with the emission limitations in that regulation except that replacement of the particulate emissions control device associated with the affected facility shall subject it to the standard contained in this section.

#### **Section 5. Standard for Sulfur Dioxide.**

- (1) Except as provided for in Section 3(3) and subsection (5) of this section, no owner or operator of an affected facility subject to the provisions of this regulation shall cause to be discharged into the atmosphere from that affected facility, any gases which contain sulfur dioxide in excess of that specified in Appendix B of this regulation.

- (2) When different fuels are burned simultaneously in any combination, the applicable standard shall be determined by proration using the following formula:

$$\text{Allowable Sulfur Dioxide Emission, lb/MM BTU} = \frac{y(a) + z(b)}{y + z}$$

Where:

- y = the percent of total heat input derived from liquid or gaseous fuel;
- z = the percent of total heat input derived from solid fuel;
- a = the allowable sulfur dioxide emission in pounds per million BTU heat input derived from liquid or gaseous fuel; and
- b = the allowable sulfur dioxide emissions in pounds per million BTU heat input derived from solid fuel.
- (3) Compliance shall be based on the total heat input from all fuels burned, including gaseous fuels.
- (4) In counties classified as VA with respect to sulfur dioxide, for sources having a total heat input greater than fifteen hundred million BTU per hour (1500 MMBTU/hr.) as determined by Section 3(1), no owner or operator shall allow the annual average sulfur dioxide emission rate from all existing and new affected facilities combined at the source to exceed 0.60 pounds per million BTU.
- (5) In counties classified as IA with respect to sulfur dioxide, at sources having a total rated heat input greater than fifteen hundred million BTU per hour (1500 MM BTU/hr.) as determined by Section 3(1), the department shall allow one (1) affected facility, as specified on the operating permit, to emit sulfur dioxide at a rate not to exceed a twenty-four (24) hour average of 8.0 pounds per million BTU, during those periods of time when the affected facility is being operated for the purpose of generating high sulfur dioxide content flue gases for use in any experimental sulfur dioxide removal system.

#### **Section 6. Monitoring of Operations.**

- (1) The sulfur content of solid fuels, as burned, shall be determined in accordance with the methods specified by the department.
- (2) The sulfur content of liquid fuels, as burned, shall be determined in accordance with the methods specified by the department.
- (3) The rate of fuel burned for each fuel shall be measured daily or at shorter intervals and recorded. The heating value and ash content of fuels shall be ascertained at least once per week and recorded. Where the indirect heat exchanger is used to generate electricity, the average electrical output and the minimum and maximum hourly generation rate shall be measured and recorded daily.
- (4) The owner or operator of any indirect heat exchanger of more than 250 million BTU per hour heat input subject to the provisions of this regulation and summarized monthly. The record of any such measurement(s) required by this regulation and summarized monthly.
- (5) The department may require for any indirect heat exchanger of less than 250 million BTU per hour heat input any or all the fuel monitoring

required by this section.

- (6) For an indirect heat exchanger that does not use a flue gas desulfurization device, a continuous monitoring system as specified in 401 KAR 61:005 for measuring sulfur dioxide, a continuous monitoring system as specified in 401 KAR 61:005 for measuring sulfur dioxide emissions is not required if the owner or operator monitors such emissions by fuel sampling and analysis pursuant to Section 7(6) of 401 KAR 59:015.

#### **Section 7. Test Methods and Procedures.**

- (1) Except as provided in 401 KAR 50:045, performance tests used to demonstrate compliance with Sections 4 and 5 shall be conducted according to the following methods (filed by reference in 401 KAR 50:015):
  - (a) Reference Method 1 for the selection of sampling site and sample traverses;
  - (b) Reference Method 3 for gas analysis to be used when applying Reference Methods 5, 6, and 7;
  - (c) Reference Method 5 for the concentration of particulate matter and the associated moisture content;
  - (d) Reference Method 6 for the concentration of sulfur dioxide; and
  - (e) Reference Method 7 for the concentration of nitrogen oxides.
- (2) For Reference Method 5, Reference Method 1 shall be used to select the sampling site and the number of traverse sampling points. The sampling time for each run shall be at least sixty (60) minutes and the minimum sampling volume shall be 0.85 dscm (thirty (30) dscf) except that smaller sampling times or volumes, when necessitated by process variables or other factors, may be approved by the department. The probe and filter holder heating systems in the sampling train shall be set to provide a gas temperature no greater than 160 °C (320 °F).
- (3) For Reference Methods 6 and 7, the sampling site shall be the same as that selected for Reference Method 5. The sampling point in the duct shall be at the centroid of the cross section or at a point no closer to the walls than one (1) m (3.28 ft). For Reference Method 6, the sample shall be extracted at a rate proportional to the gas velocity at the sampling point.
- (4) For Reference Method 6, the minimum sampling time shall be twenty (20) minutes and the minimum sampling volume shall be 0.02 dscm (0.71 dscf) for each sample. The arithmetic mean of two (2) samples shall constitute one (1) run. Samples shall be taken at approximately thirty (30) minute intervals.
- (5) For Reference Method 7, each run shall consist of at least four (4) grab samples taken at approximately fifteen (15) minute intervals. The arithmetic mean of the samples taken shall constitute the run value.
- (6) For each run using the methods specified by subsection (1)(c), (d), and (e) of this section, the emissions expressed in g/million cal (lb/million BTU) shall be determined by the following equation:

$$E = CF \frac{20.9}{20.9 - \%O_2}$$

Where:

- E = pollutant emission, g/million cal (lb/million BTU).
- C = pollutant concentration, g/dscm (lb/dscf) determined by Reference Method 5, 6 or 7.
- F = a factor as determined in 401 KAR 59:015, Section 7.
- %O<sub>2</sub> = oxygen content by volume (expressed as percent), dry basis. Percent oxygen shall be determined by using the integrated or grab sampling and analysis procedures for Reference Method 3 as applicable. The sample shall be obtained as follows:
- (a) For determination of sulfur dioxide and nitrogen oxides emissions, the oxygen sample shall be obtained simultaneously at the same point for Reference Method 6 and 7 determinations, respectively. For Reference Method 7, the oxygen sample shall be obtained using the grab sampling and analysis procedures for Reference Method 3.
  - (b) For determination of particulate emissions, the oxygen sample shall be obtained simultaneously by traversing the duct at the same sampling location used for each run of Reference Method 5 under subsection (2) of this section. Reference Method 1 shall be used for selection of the number of traverse points except that no more than twelve (12) sample points required.
- (7) When combinations of fossil fuels are fired, the heat input, expressed in cal/hr (BTU/hr), shall be determined during each testing period by multiplying the gross calorific value of each fuel fired by the rate of each fuel burned. Gross calorific value shall be determined in accordance with ASTM methods D2015- 66(72) (solid fuels), D240-64(73) (liquid fuels), or D1826-64(70) (gaseous fuels), as applicable (ASTM designations filed by reference in 401 KAR 50:015.) The rate of fuels burned during each testing period shall be determined by suitable methods and shall be confirmed by a material balance over the steam generation system.

#### **Section 8. Compliance Timetable.**

- (1) Affected facilities located in areas designated as attainment for sulfur dioxide and/or particulate matter shall be in compliance on the effective date of this regulation.
- (2)
  - (a) In Class IA counties designated as non-attainment for sulfur dioxide, the owner or operator of any affected facility in any source whose total rated capacity is sixteen thousand million BTU per hour (16,000 MM BTU/hr) or more shall be required to complete the following:
    - 1. Submit a final control plan for achieving compliance with this regulation no later than May 1, 1978;
    - 2. Award contracts for complying coal by January 1, 1979;
    - 3. Initiate use of complying coal on or before December 1, 1979;
    - 4. Demonstrate compliance by performance tests on or before October 1, 1981.
  - (b) In Class IVA counties designated as non-attainment for sulfur dioxide, the owner or operator of any affected facility in any source with a total rated capacity of greater than fifteen hundred million BTU per hour (1500 MM BTU/hr) but less than twenty-one

thousand million BTU per hour (21,000 MM BTU/hr) shall be required to complete the following:

1. Submit a final control plan for achieving compliance with this regulation no later than May 1, 1979;
  2. Award contracts for complying coal by August 1, 1979;
  3. Initiate use of such complying coal on or before January 1, 1980.
- (c) In Class IVA counties designated as non-attainment for sulfur dioxide, the owner or operator of any affected facility in any source with a total rated capacity of greater than twenty-one thousand million BTU per hour (21,000 MM BTU/hr) shall be required to complete the following:
1. Submit a control plan for flue gas desulfurization and initiate construction of a coal washing plant on or before June 1, 1978;
  2. Issue invitations for bids for construction and installation of flue gas desulfurization equipment on or before October 1, 1978;
  3. Award contract for construction and installation of flue gas desulfurization equipment on or before March 1, 1979;
  4. Initiate construction of flue gas desulfurization equipment on or before December 1, 1979.
  5. Complete construction of coal washing plant on or before December 1, 1980.
  6. Complete construction of flue gas desulfurization equipment on or before June 1, 1982.
  7. Demonstrate compliance by performance tests on or before September 1, 1982.
- (d) The owner or operator of any affected facility located in any area designated non-attainment for sulfur dioxide and/or particulate matter, except as provided for in paragraphs (a), (b) and (c) of this subsection, shall demonstrate compliance with this regulation as expeditiously as practicable but in no case later than December 31, 1982.

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